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New species, new synonymies, and additional records of *Leptusa* from Turkey and Iran (Coleoptera: Staphylinidae: Aleocharinae)

V. ASSING

A b s t r a c t : Six species from Turkey and Iran are described and illustrated: *Leptusa* (*Stictopisalia*) *flagellulifera* nov.sp. (Turkey: Kastamonu), *L. (Dysleptusa) persica* nov.sp. (Iran: Mazandaran), *L. (Roubaliusa) soriciformis* nov.sp. (Iran: Mazandaran), *L. (R.) delphiniformis* nov.sp. (Iran: Mazandaran), *L. (R.) piciformis* nov.sp. (Iran: Gilan), and *L. (R.) flagrifer* nov.sp. (Iran: Gilan). Two synonymies are proposed: *L. confinis* PACE 1982 = *L. paphlagonica* PACE 1982, nov.syn., = *L. othmaniorum* PACE 1983, nov.syn. *Leptusa amisensis* PACE 1982, previously a subspecies of *L. ionopolitana* PACE 1982, is regarded as distinct species. The sexual characters of *L. janczyki* PACE 1983, *L. ionopolitana*, *L. amisensis*, and *L. sengleti* PACE 1984 are illustrated. Additional records of *Leptusa* species from Turkey and Iran are reported, among them a new country record from Iran. Catalogues of the *Leptusa* species of Turkey and Iran are provided. The distributions of 13 species are mapped.

K e y w o r d s : Coleoptera, Staphylinidae, Aleocharinae, *Leptusa*, Turkey, Iran, taxonomy, new species, new synonymies, distribution, new records.

Introduction

In the Palaearctic region, the speciose aleocharine genus *Leptusa* KRAATZ 1856 is represented by more than 350 species and numerous subspecies (ASSING 2009b, PACE 1989, SMETANA 2004). The *Leptusa* fauna of Turkey previously comprised 26 species and two doubtful subspecies in seven subgenera, with one species listed as incertae sedis; for a catalogue and distribution maps of the subgenera and individual species see ASSING (2007a, 2009a). Only two species, *L. (Roubaliusa) sengleti* PACE 1984 and *L. (Stictopisalia) armeniaca* PACE 1989, were previously known from Iran (ASSING 2008, PACE 1989).

The present paper is mainly based on material recently collected during three field trips, one of them conducted by Andreas Pütz (Eisenhüttenstadt) to northern Iran in spring 2008, one by Volker Brachat (Geretsried) and Heinrich Meybohm (Großhansdorf) to central southern Anatolia in spring 2009, and one by Paul Wunderle (Mönchengladbach) and the author to northern Turkey in spring 2009. Also, previously unrevised type material of several species described from Turkey was studied. The material yielded not only several records of zoogeographic interest, but also as many as six undescribed species,

one from Turkey and five from Iran, and two new synonymies. The *Leptusa* fauna of Turkey now includes 27 valid species in seven subgenera, that of Iran eight species in three subgenera.

Material and methods

The material referred to in this study is deposited in the following public institutions and private collections:

MHNG Muséum d'Histoire naturelle Genève (G. Cuccodoro)

NHMW Naturhistorisches Museum Wien (H. Schillhammer)

cAss..... author's private collection

cPüt private collection Andreas Pütz, Eisenhüttenstadt

cWun..... private collection Paul Wunderle, Mönchengladbach

The morphological studies were carried out using a Stemi SV 11 microscope (Zeiss Germany) and a Jenalab compound microscope (Carl Zeiss Jena). For the photographs a digital camera (Nikon Coolpix 995) was used.

The maps were generated using the online generic mapping tool (GMT) of the Geomar website at www.aquarius.ifm-geomar.de/omc.

Head length was measured from the anterior margin of the clypeus to the posterior margin of the head, elytral length at the suture from the apex of the scutellum to the posterior margin of the elytra. The length of the median lobe of the aedeagus was measured from the apex of the ventral process to the base of the proximal capsule.

Species descriptions and additional records

Leptusa (Neopisalia) laeviuscula (HOCHHUTH 1849) (Map 3)

Material examined: Iran: Mazandaran: 1 ex., Sari county, Mohammadabad, NE Sangdeh, 36°04'N, 53°10'E, 1530 m, beech forest, 29.V.2008, leg. Pütz (cPüt); 2 exs., Sari county, Mohammadabad, 1 km W Afra Chal, 36°14'N, 53°14'E, 520 m, leaf litter sifted, 30.V.2008, leg. Pütz (cPüt, cAss); 2 exs., Sari county, Mohammadabad, E Qolqol, 36°10'N, 53°16'E, 920 m, leaf litter sifted, 29.V.2008, leg. Pütz (cPüt, cAss).

Comment: *Leptusa laeviuscula* was previously known only from Azerbaijan and Armenia (PACE 1989). The above specimens represent the first records from Iran (Map 3).

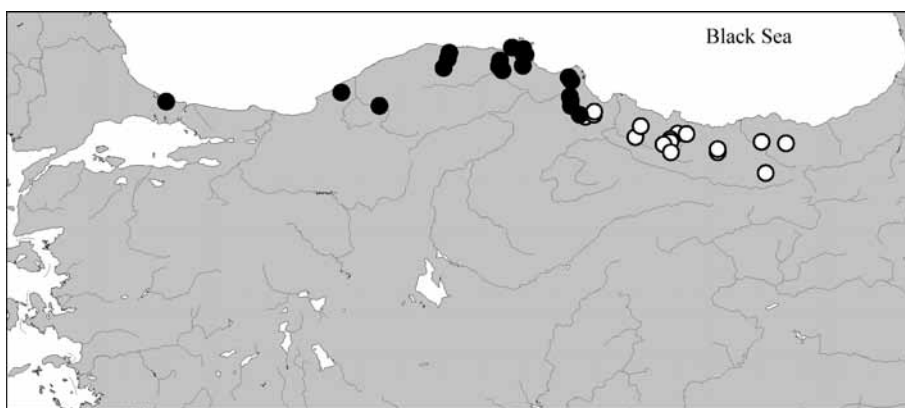
Leptusa (Neopisalia) janczyki PACE 1983 (Figs 1-3)

Leptusa (Neopisalia) janczyki PACE 1983: 74.

Type material examined: Holotype ♂: "♂ / Lederi Epp., Lagistan, Pont Euxin mer., Dieck / Typus / Holotypus *Leptusa janczyki* m, det. R. Pace 1981" (NHMW).

Comment: The above holotype was examined to clarify the identity of *L. janczyki* and the status of *L. soganlica* ASSING 2007, which was described from the Soganlı Dağı in Trabzon. Based on the illustration of the aedeagus of *L. janczyki* in the original description, there was a chance that the types of both names were conspecific (ASSING 2009a). The type locality of *L. janczyki* is doubtful; according to ANLAŞ (pers. comm.), Lagistan is situated in northeastern Anatolia and the holotype was probably found somewhere in Trabzon or Rize provinces.

A comparison of the type material of *L. janczyki* and *L. soganlica* revealed some difference in the male primary and secondary sexual characters. In *L. janczyki*, the male elytra (Fig. 1) have elevations on either side of the scutellum (absent in *L. soganlica*), the tubercle on the male tergite VII (Fig. 2) is separated from the posterior margin by approximately its length (situated directly at posterior margin in *L. soganlica*), and the median lobe of the aedeagus (Fig. 3) has a median process of somewhat different shape (more slender and apically less acute); for comparison see the illustrations of *L. soganlica* in ASSING (2007a). Since these differences are not pronounced, the possibility that *L. soganlica* and *L. janczyki* are conspecific can still not be ruled out completely. However, the observed differences are constant in the examined material, so that *L. soganlica* is regarded as a valid species for the time being. More material is needed to confirm or reject this hypothesis.



Map 1: Distributions of *Leptusa confinis* PACE (open circles) and *L. diecki* PACE (filled circles).

Leptusa (Neopisalia) confinis PACE 1982 (Map 1)

Leptusa (Neopisalia) diecki confinis PACE 1982: 591.

Leptusa (Neopisalia) othmaniorum paphlagonica PACE 1982: 591; **nov.syn.**

Leptusa (Neopisalia) othmaniorum PACE 1983: 75; **nov.syn.**

Type material examined: *L. paphlagonica*: Holotype ♂: "Turquie, Kastamonu, S/ Küre à 5 km S, 1200 m, 18.V.76, Besuchet Löbl / Holotypus *Leptusa othmaniorum paphlagonica* m, det. R. Pace 1981 / *Leptusa paphlagonica* n. ssp., det. R. Pace 1981 / *Leptusa confinis* Pace, det. V. Assing 2009" (MHNG). Paratypes: 1 ♂, 1 ♀: same data as holotype (MHNG); 1 ♂, 5 ♀: "Turquie, Kastamonu, Küre à 5 km N, 600 m, 18.V.76, Besuchet Löbl" (MHNG). *L. othmaniorum*: Paratypes: 2 ♂ ♂: "Turquie, Istanbul, Forêt de Belgrade, 10.VII.69, Besuchet / Paratypus *Leptusa othmaniorum* m., det. R. Pace 1981" (MHNG); 2 ♂ ♂, 1 ♀: "Turquie, Zonguldak, S/ Zonguldak, 500 m, 23.V.76, Besuchet Löbl / *Leptusa confinis* Pace, det. V. Assing 2009" (MHNG).

Additional material examined [see also ASSING 2009a]: Turkey: **Samsun**: 2 exs., 9 km WNW Bafra, 41°35'N, 35°50'E, 55 m, mixed deciduous forest with oak, *Hedera* and *Rubus* undergrowth, 30.III.2009, leg. Assing (cAss). **Sinop**: 2 exs., 25 km S Sinop, W Lala, 41°44'N, 35°01'E, 215 m, oak forest with undergrowth, sifted, 41.III.2009, leg. Assing (cAss); 6 exs., 25 km S Sinop, W Lala, 41°53'N, 35°02'E, 240 m, oak forest with undergrowth, sifted, 31.III.2009, leg. Assing & Wunderle (cAss, cWun); 5 exs., ca. 22 km S Sinop, N Lala, 41°53'N, 35°03'E, 160 m, oak and laurel forest with undergrowth, sifted, 31.III.2009, leg.

Assing & Wunderle (cAss, cWun); 3 exs., ca. 28 km S Sinop, S Lala, 41°53'N, 35°03'E, 150 m, oak and laurel forest with undergrowth, sifted, 31.III.2009, leg. Assing (cAss); 2 exs., ca. 30 km S Ayancık, Çangal Dağı, 41°48'N, 34°37'E, 360 m, moist sycamore forest with rocks, sifted, 1.IV.2009, leg. Wunderle (cWun, cAss); 1 ex., Çangal Dağı, forest south of Ayancık, VI.1966, leg. Schubert (cAss); 1 ex., Çangal Dağı, V.1957, leg. Schubert (cAss); 4 exs., Çangal Dağı, VI.1960, leg. Schubert (cAss); 1 ex., Çangal Dağı, VII.1961, leg. Schubert (cAss); 4 exs., 30 km SW Sinop, 7 km NW Erfelek, 41°58'N, 34°50'E, 65 m, mixed deciduous forest (*Carpinus*, *Quercus*, *Laurus*), sifted, 2.IV.2009, leg. Assing (cAss); 1 ex., 15 km SW Sinop, S Kılıçlı, 41°57'N, 35°02'E, 80 m, grassy road margin, grass between shrubs, sifted, 3.IV.2009, leg. Assing (cAss).
 K a s t a m o n u : 1 ♂: "Turquie - Kastamonu, à 13 km E Ağlı, 1200 m, 18.V.76, Besuchet Löbl / "Paratypus *Leptusa othmaniorum paphlagonica* m, det. R. Pace 1981" (MHNG); 1 ♀: "Turquie, Kastamonu, S\ Inebolu, 600 m, 18.V.76, Besuchet Löbl / Paratypus *Leptusa othmaniorum paphlagonica* m, det. R. Pace 1981" (MHNG). Z o n g u l d a k : 1 ex., Karabük-Yenice, V.1962, leg. Schubert (cAss).

C o m m e n t : The original description of *L. othmaniorum paphlagonica* is based on the holotype and 11 paratypes from "Turquie, Kastamonu, Küre" (PACE (1982).

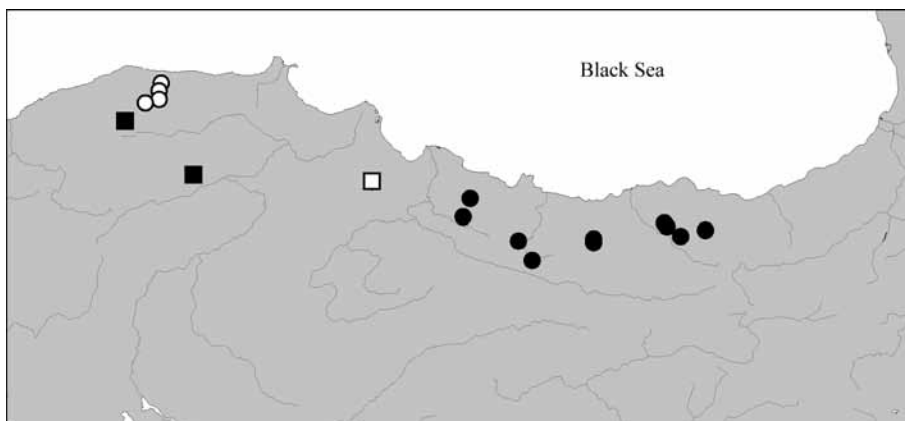
The original description of *L. othmaniorum*, which was published without any illustrations of the genitalia, is based on 39 type specimens from "Turch.", "Turquie, Istanbul, Forêt de Belgrade", "Zoguldak" [sic], and "Goeck-Dagh". PACE (1983) states that the holotype is deposited in the NHMW, but fails to specify which of the above specimens is in fact the holotype. The additional specimens from other localities in Kastamonu, which are labelled as paratypes, are not specified in the original description have therefore no type status.

Since the description of *L. othmaniorum paphlagonica* was published prior to that of *L. othmaniorum*, *L. paphlagonica* takes precedence. For a detailed discussion of this nomenclatural problem see ASSING (2002).

An examination of the above types and the additional material listed above and by ASSING (2003a, 2009a) revealed considerable intraspecific variation, even within populations, of size, length and width of elytra, and also in the shape and internal structures of the aedeagus, but no difference were found suggesting that the populations from different localities should represent distinct species. The elytra tend to be longer and broader towards the west of the distribution, but all the observed differences are linked by transitions, suggesting that the sampled populations are conspecific. Further evidence comes from zoogeography. The rather extensive distribution of *L. confinis*, in relation to that of other Turkish representatives of the subgenus *Neopisalia* SCHEERPELTZ 1966 (ASSING 2007a), is paralleled by several other groups of Staphylinidae with endemic species. Distributions tend to be less restricted in northwestern than in northeastern Turkey, as is the case in also in genera such as *Aploderus* STEPHENS 1833, *Stenus* LATREILLE 1797, and *Lathrobium* GRAVENHORST 1802 (ASSING 2001, 2007b, 2007c).

In consequence, *L. confinis*, *L. paphlagonica*, and *L. othmaniorum* are regarded as synonyms. Both *L. confinis* and *L. paphlagonica* were published in the same article paper and on the same page, one year prior to *L. othmaniorum*. *Leptusa confinis* is designated as the senior name, of which *L. paphlagonica* and *L. othmaniorum* become junior synonyms.

Leptusa confinis was previously known only Samsun and Sinop provinces (ASSING 2009a), but is apparently widespread from Istanbul in the west to Samsun in the east, its distribution bordering on that of the closely related *L. diecki* PACE in Samsun (Map 1).



Map 2: Distributions of four species of the subgenus *Stictopisalia* in northern Turkey, based on revised records: *Leptusa ionopolitana* PACE (open circles), *L. fibula* ASSING (filled circles), *L. amisensis* PACE (open square), and *L. flagellulifera* nov.sp. (filled squares).

***Leptusa (Stictopisalia) ionopolitana* PACE 1982 (Figs 49-51, Map 2)**

Leptusa (Stictopisalia) ionopolitana PACE 1982: 587 f.

Type material examined: Holotype ♂: "Turquie, Kastamonu, Inebolu-Küre, 700 m, 18.V.76, Besuchet Löbl / Holotypus *Leptusa ionopolitana* m, det. R. Pace 1981 / *Leptusa ionopolitana* n. sp., det. R. Pace 1981" (MHNG). **Paratypes:** 2♂♂, 2♀♀ [type status uncertain]: "Turquie, Kastamonu, Küre à 5 km N, 600 m, 18.V.76, Besuchet Löbl" (MHNG); 1♂, 3♀♀ [type status uncertain]: "Turquie, Kastamonu, S/ Inebolu, 600 m, 18.V.76, Besuchet Löbl" (MHNG); 1♀ [type status uncertain]: "Turquie, Kastamonu, S/ Küre à 5 km S, 1200 m, 18.V.76, Besuchet Löbl" (MHNG); 2♂♂, 1♀: "Turquie - Kastamonu, à 13 km E Ağlı, 1200 m, 18.V.76, Besuchet Löbl" (MHNG).

Comment: The original description of *L. ionopolitana* is based on eight specimens from "Turquie, Kastamonu, Inebolu-Küre, 700 m, 18.V.76, leg. Besuchet-Löbl" and three specimens from "à 13 km E da Ağlı, 1200 m, 18.V.76, leg. Besuchet-Löbl" (PACE 1982). According to this description, the holotype is deposited in "coll. Mus. Genève", but it is not specified, which of the type specimen is designated as the holotype and which is the type locality. Also, only one of the above type specimens was actually collected in the locality "Inebolu-Küre" and at "700 m". Moreover, there are more specimens labelled as paratypes than there are type specimens indicated in the original description. Consequently, the type status of all the paratypes, except for those from "13 km E Ağlı", is uncertain. The aedeagus and the spermatheca of this species are illustrated in Figs 49-51. This species is currently known only from four localities in Kastamonu province (Map 2).

***Leptusa (Stictopisalia) amisensis* PACE 1982 (Fig. 52, Map 2)**

Leptusa (Stictopisalia) ionopolitana amisensis PACE 1982: 588.

Type material examined: Holotype ♀: "Turquie, Samsun, Samsun-Kavak, 20.V.67, Cl. Besuchet / Holotypus *Leptusa ionopolitana amisensis* m, det. R. Pace 1981 / *Leptusa ionopolitana amisensis* n. ssp., det. R. Pace 1981" (MHNG).

Comment: The original description of *L. amisensis* is based on a single female [sic] from "Turquie, Samsun, Samsun-Kavak" (PACE 1982). Although similar in colora-

tion and other external characters to *L. ionopolitana* and also geographically close, it seems to represent a distinct species, as is suggested by the different shape of the spermatheca (Fig. 52). Males from the type locality (Map 2) or its vicinity would be required to clarify the status of *L. amisensis*.

***Leptusa (Stictopisalia) flagellulifera* nov.sp.** (Figs 4-9, 16-20, Map 2)

Type material: Holotype ♂: "TR [27a] - Kastamonu, 15 km N Tosya, Ilgaz geç., 41°07'32"N, 34°04'12"E, 1660 m, 6.VI.2009, V. Assing / Holotypus ♂ *Leptusa flagellulifera* sp.n. det. V. Assing 2009" (cAss). Paratypes: 1♂, 2♀♀: same data as holotype (cAss, OÖLL); 1♀: same data, but leg. Wunderle (cWun); 1♂, 3♀♀: "TR [30a] - Kastamonu, 40 km NW Kastamonu, 41°34'04"N, 33°20'22"E, 1270 m, mixed forest, 9.VI.2009, V. Assing (cAss); 2♀♀, same data, but "[30] ... 7.IV.2009" (cAss); 2♀♀: same data, but leg. Wunderle (cWun).

Description: 2.7-3.3 mm. Habitus as in Fig. 1. Coloration: body blackish-brown to blackish; legs reddish; antennae dark-brown, with the basal 2-3 antennomeres reddish.

Head weakly transverse; punctation rather sparse, fine, and shallow, barely visible in the pronounced microsculpture; eyes weakly protruding from lateral contours of head, approximately as long as postocular region in dorsal view (Fig. 5). Antenna moderately incrassate apically; antennomere IV approximately as long as wide, X little more than 1.5 times as wide as long.

Pronotum approximately 1.25 times as wide as long and 1.2 times as wide as head; maximal width in anterior half; punctation extremely fine, barely noticeable in the pronounced microreticulation (Fig. 5).

Elytra without sexual dimorphism; approximately as wide as or slightly wider than pronotum, at suture approximately 0.7 times as long as pronotum; humeral angles weakly pronounced, but noticeable (Fig. 5); punctation rather dense, much more pronounced than that of pronotum; microsculpture shallow, interstices with some shine. Hind wings reduced.

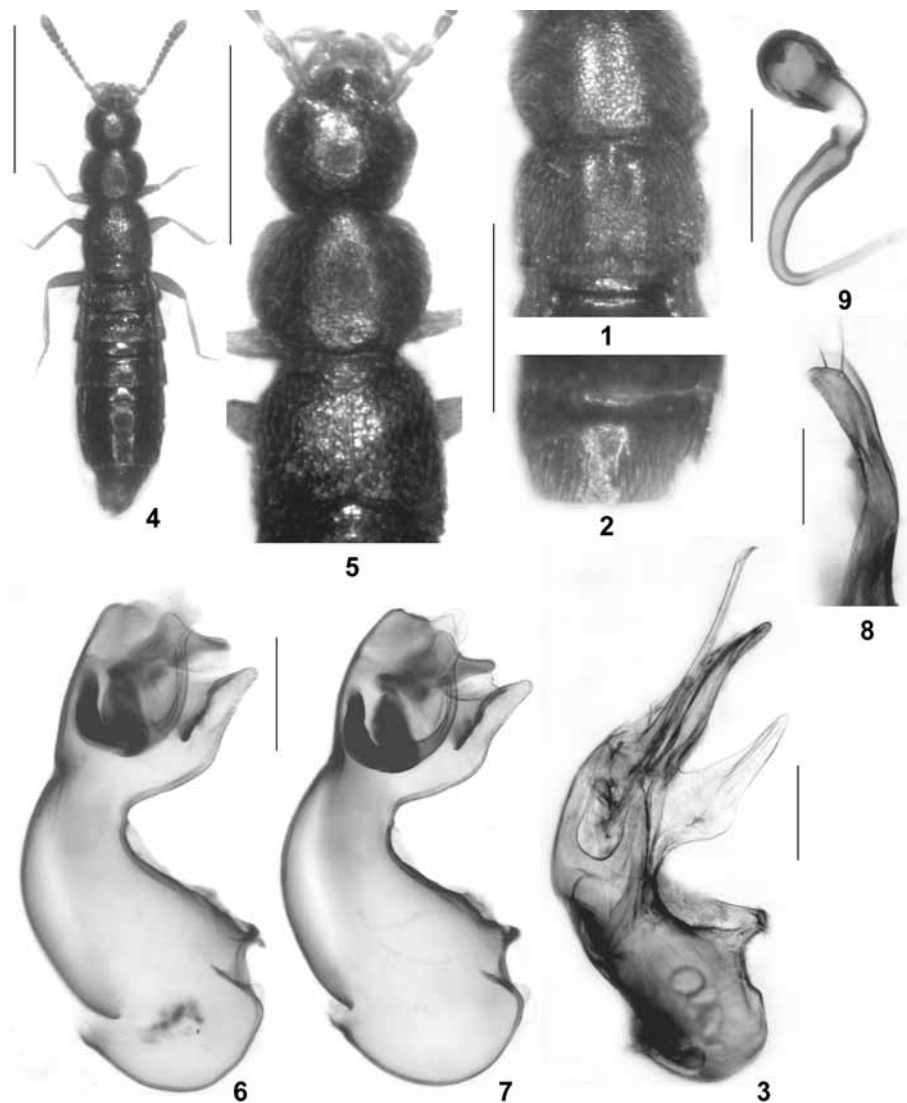
Abdomen subparallel, widest at segment VI, approximately 1.2 times as wide as elytra; punctation extremely fine, sparser on posterior than on anterior tergites; microsculpture distinct everywhere; tergites VII-VIII without sexual dimorphism; tergite VIII anteriorly with numerous gland openings (Fig. 16, 20); posterior margin of tergite VII with narrow palisade fringe.

♂: sternite VII unmodified (Fig. 17), anteriorly with numerous gland openings (Fig. 19); sternite VIII posteriorly obtusely angled (Fig. 18); median lobe of aedeagus (Figs 6-7) with ventral process smoothly sinuate, not angled; internal structures of characteristic morphology, flagellum short; apical lobe of paramere as in Fig. 8.

♀: posterior margin of sternite VIII broadly convex; spermatheca as in Fig. 9.

Etymology: The name (Latin, adjective: carrier of a small flagellum) alludes to the short flagellum in the internal sac of the aedeagus, one of the characters distinguishing *L. flagellulifera* from similar consubgenera.

Comparative notes: Five species of the subgenus *Stictopisalia* SCHEERPELTZ 1966 were previously known from Turkey: *L. artviniensis* PACE 1982 (Trabzon, Rize, Artvin), *L. fibula* ASSING 2003 (Ordu, Giresun, Gümüşhane, Trabzon), *L. ionopolitana* PACE 1982 (Kastamonu), *L. amisensis* PACE 1982 (Samsun; male sexual characters unknown), and *L. merkli* BERNHAUER 1900 (Istanbul, Kocaeli, Sakarya, Bursa). The new species is distinguished from all of them by the characteristic morphology of the median lobe of the aedeagus and additionally as follows:



Figs 1-9: *Leptusa janczyki* PACE, holotype (1-3) and *L. flagellulifera* nov.sp. (4-9): (1) pronotum and elytra; (2) male tergite VII; (3, 6-7) median lobe of aedeagus in lateral view; (4) habitus; (5) forebody; (8) apical lobe of paramere; (9) spermatheca. Scale bars: 4: 1.0 mm; 1-2, 5: 0.5 mm; 3, 6-9: 0.1 mm.

from *L. artviniensis* by much darker coloration, much smaller and more slender body, distinctly less pronounced microsculpture of the head and pronotum, less coarse punctation of the elytra, and unmodified male sternite VII (*L. artviniensis*: posterior margin in the middle distinctly, broadly concave and furnished with long setae);

from *L. fibula* by larger size, uniformly dark coloration, not distinctly granulose punctation of the elytra, and slightly more pronounced microsculpture of the abdomen;

from *L. ionopolitana* by uniformly blackish coloration (*L. ionopolitana*: bicoloured, reddish with infusate preapical abdominal segments);

from *L. merkli* by the smaller and more slender body, the more pronounced microsculpture of the whole body and consequently barely noticeable punctation of head and pronotum and rather matt appearance (*L. merkli*: whole body conspicuously glossy; punctation of head and pronotum distinct).

For illustrations of the above species see PACE (1989) and ASSING (2003a). *Leptusa flagellulifera* is readily distinguished from *L. amisensis*, whose male sexual characters are unknown, by the much darker coloration alone.

Distribution and bionomics: *Leptusa flagellulifera* was found in two localities in Kastamonu province, central northern Anatolia (Map 1). The type specimens were sifted from leaf litter of a mixed fir and pine forest (near and under snow) and of a mixed forest with fir, pine, and beech at altitudes of 1270 and 1660 m.

***Leptusa (Dysleptusa) persica* nov.sp.** (Figs 10-15, Map 3)

Type material: Holotype ♂: "Iran, Prov. Mazandaran [IR08-22], Tonekabon County, Elburz Mts., N-Slope, 4.5 km SW Khanian, Sehezar forest, leaves debris, sifted, small stream, 942 m, 05.VI.2008, 36°32'61.7"N, 50°49'89.2"E [recte: 36°32.617'N, 50°49.892'E], leg. A. Pütz / Holotypus ♂ *Leptusa persica* sp. n. det. V. Assing 2009" (cPüt).

Description: 2.0 mm. Habitus as in Fig. 10. Coloration: body blackish, with the pronotum, the elytra, and the anterior and posterior abdominal segments slightly paler, dark brown; legs and antennomeres I-II reddish; antennomeres III-XI dark brown.

Head approximately as wide as long; punctation rather sparse, very fine, barely visible in the pronounced microsculpture; integument matt; eyes not protruding from lateral contours of head, shorter than postocular region in dorsal view (Fig. 11). Antenna strongly incrassate apically; antennomere IV weakly transverse, X almost twice as wide as long (Fig. 12).

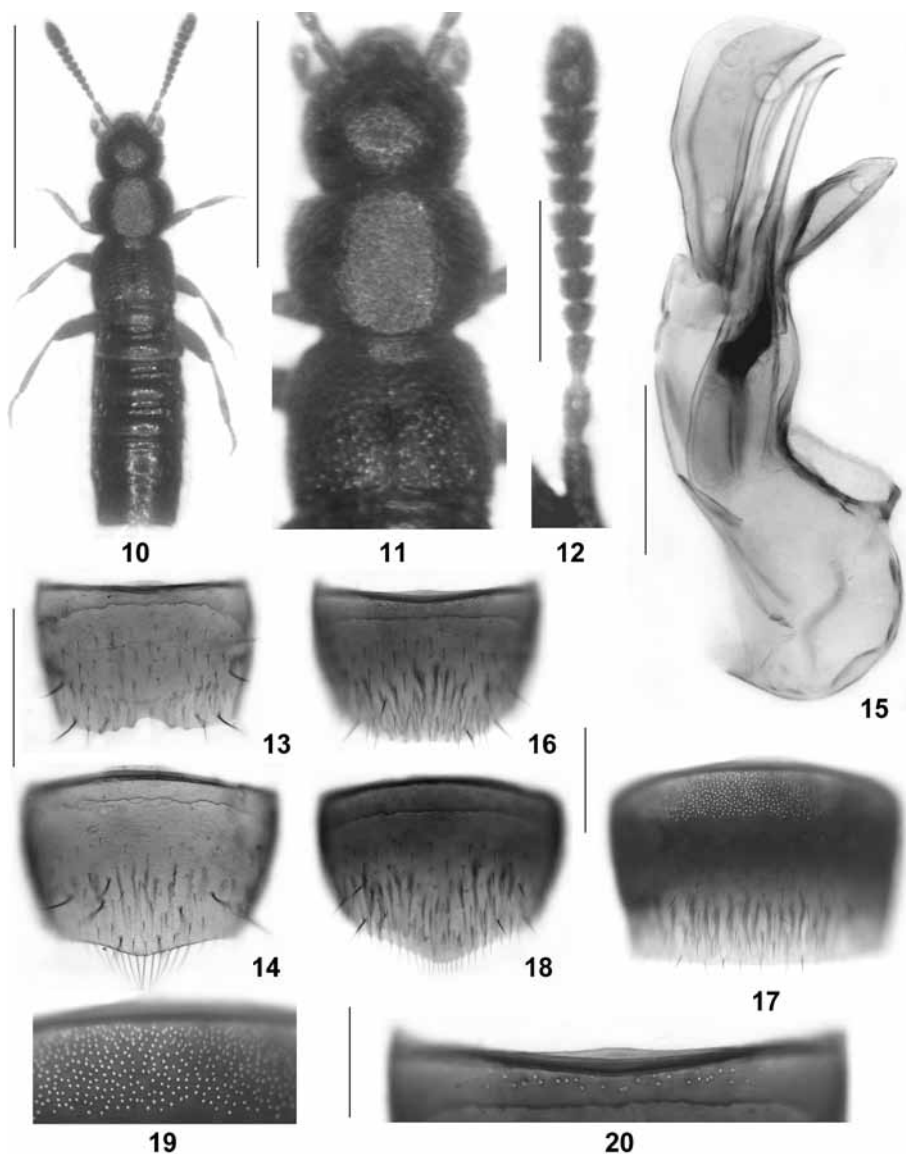
Pronotum approximately 1.35 times as wide as long and 1.25 times as wide as head; maximal width in anterior half; punctation extremely fine, barely noticeable in the pronounced microreticulation; integument matt (Fig. 11).

Elytra without sexual dimorphism; approximately as wide as pronotum, at suture approximately 0.8 times as long as pronotum; humeral angles weakly pronounced, but noticeable (Fig. 11); punctation rather dense and coarse, much more pronounced than that of pronotum; microsculpture shallow, interstices with some shine. Hind wings reduced.

Abdomen subparallel, widest at segments V-VI, slightly wider than elytra; punctation very fine, sparser on posterior than on anterior tergites; microsculpture shallow, interstices somewhat shiny; posterior margin of tergite VII with narrow palisade fringe.

♂: tergites VII and VIII without median tubercle; posterior margin of tergite VIII with somewhat irregular outline, in the middle concave (Fig. 13); sternite VII unmodified; sternite VIII posteriorly obtusely angled and with long setae (Fig. 14); median lobe of aedeagus as in Fig. 15.

♀: unknown.

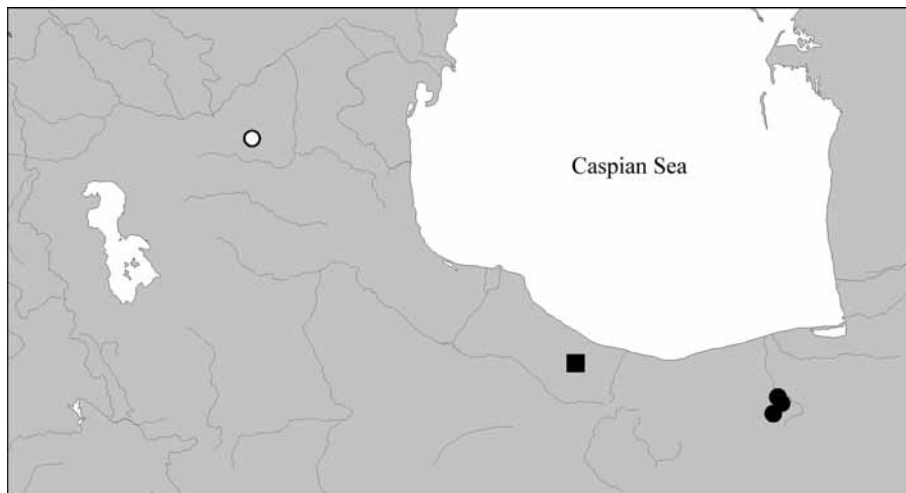


Figs 10-20: *Leptusa persica* nov.sp. (10-15) and *L. flagellulifera* nov.sp. (16-20): (10) habitus; (11) forebody; (12) antenna; (13, 16) male tergite VIII; (14, 18) male sternite VIII; (15) median lobe of aedeagus in lateral view; (17) male sternite VII; (19) medio-basal portion of male sternite VII; (20) basal portion of male tergite VIII. Scale bars: 10: 1.0 mm; 11: 0.5 mm; 12-14, 16-18: 0.2 mm; 15, 19-20: 0.1 mm.

E t y m o l o g y : The name (Latin, adjective) refers to the fact that this species is the first representative of the subgenus from Iran.

Comparative notes: The aedeagus is most similar to those of the geographically close *L. fauveli* EPPELSHEIM from the Talysh mountains (Azerbaijan) and *L. fuliginosa* (AUBÉ 1850) (Caucasus region, Turkey), but distinguished especially by the completely different shape of the ventral process in lateral view. For figures of *L. fauveli* see PACE (1989), for an illustration of the aedeagus of *L. fuliginosa* see ASSING (2003a).

Distribution and bionomics: The type locality is situated in Mazandaran province, northern Iran (Map 3). The holotype was sifted from leaf litter near a stream at an altitude of approximately 940 m.



Map 3: Distributions of *Leptusa (Stictopisalia) armeniaca* PACE (open circle), *L. (Neopisalia) laeviuscula* (HOCHHUTH) (filled circles), and *L. (Dysleptusa) persica* nov.sp. (square) in northern Iran.

***Leptusa (Roubaliusa) sengleti* PACE 1984** (Figs 53-54, Map 4)

Leptusa (Roubaliusa) sengleti PACE 1984: 212 ff.

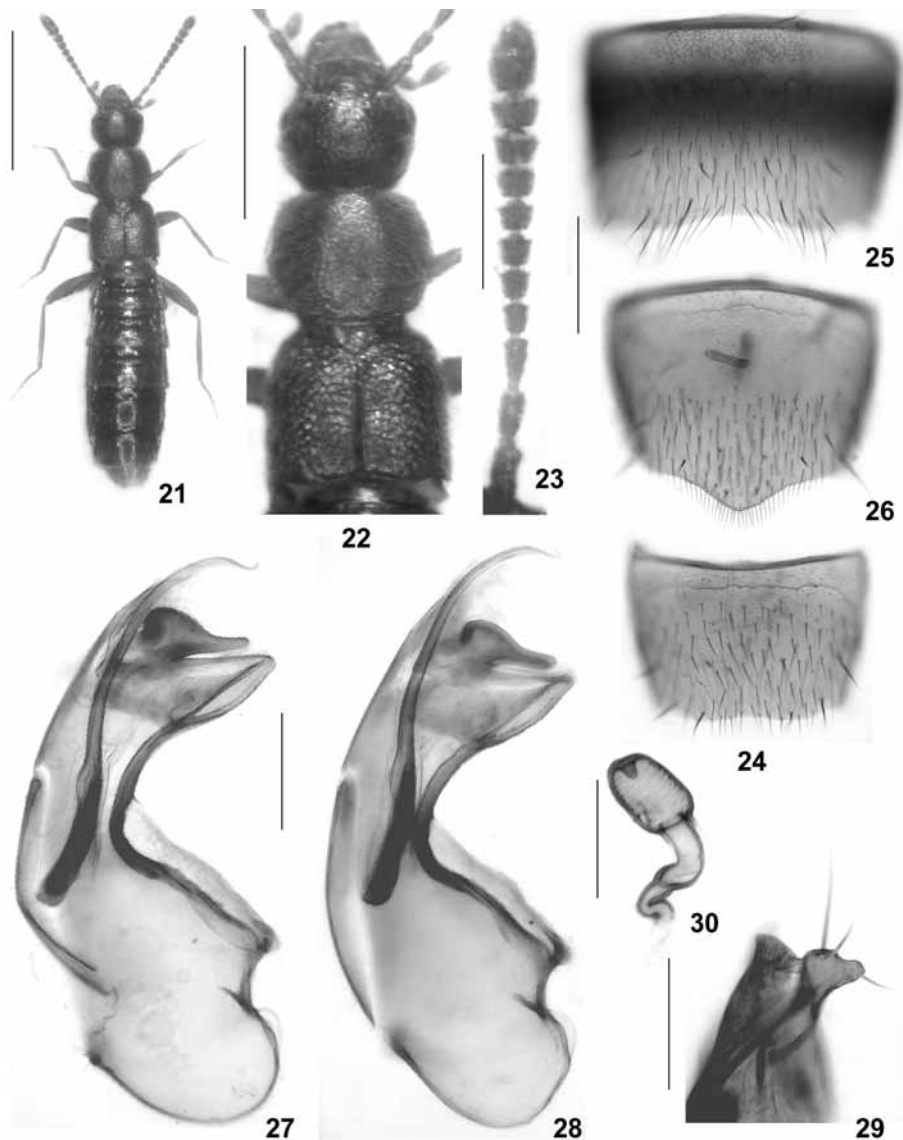
Type material examined: Holotype ♂: "Iran, Guilân, sur Asâlem, 450 m, 37°42'N, 48°53'E, A. Senglet, 10.6.75 / Holotypus *Leptusa sengleti* mihi, det. R. Pace 1983 / *Leptusa sengleti* n. sp., det. R. Pace 1983 (MHNG).

Comment: The original description of *L. sengleti* is based on a single male (PACE 1984). The aedeagus (Fig. 53) and the male sternite VII (Fig. 54) are most similar to those of *L. piciformis* and *L. flagrifer*a, respectively. This species was the first representative of the genus to become known from Iran. It is currently known only from the type locality (Map 4).

***Leptusa (Roubaliusa) soriciformis* nov.sp.** (Figs 21-30, 46-48, Map 4)

Type material: Holotype ♂: "Iran, Prov. Mazandaran [IR08-01], Sari County, Mohammabad, Elburz Mts., N-Slope, NE Sangdeh, 1533 m, 36°04'06.6"N, 53°09'57.8"E [recte: 36°04.066'N, 53°09.578'E], Fagus forest, leaves debris, sifted, 29.V.2008, leg. A. Pütz / Holotypus ♂ *Leptusa soriciformis* sp.n. det. V. Assing 2009" (cPüt). **Paratypes:** 14 exs.: same data as holotype (cAss, cPüt); 1 ex.: "Iran, Prov. Mazandaran [IR08-01A], Sari County, Mohammabad, Elburz Mts., N-Slope, 2,2 km NE Bendela, 1533 m, 36°04'06.6"N, 53°09'57.8"E [recte: 36°04.066'N,

53°09.578'E], Fagus forest, leaves debris, sifted, 30.V.2008, leg. A. Pütz" (cPüt); 1 ♀ [tentatively attributed to this species]: "Iran, Prov. Mazandaran [IR08-03], Sari County, Mohammabad, Elburz Mts., N-Slope, E Qolqol, 36°10'26.7"N, 53°16'29.2"E [recte: 36°10.267'N, 53°16.292'E], 916 m, leaves debris, sifted, 29.V.2008, leg. A. Pütz" (cPüt).



Figs 21-30: *Leptusa soriciformis* nov.sp.: (21) habitus; (22) forebody; (23) antenna; (24) male tergite VIII; (25) male sternite VII; (26) male sternite VIII; (27-28) median lobe of aedeagus in lateral view; (29) apical lobe of paramere; (30) spermatheca. Scale bars: 21: 1.0 mm; 22: 0.5 mm; 23-26: 0.2 mm; 27-30: 0.1 mm.

Description: 2.5-3.3 mm. Habitus as in Fig. 21. Coloration: body reddish, with the head usually slightly darker at least in posterior half, abdominal segment VI and anterior half of VII blackish, and antennomeres IV-XI reddish-brown.

Head as wide as long or weakly transverse; punctation rather dense, shallow, barely visible in the pronounced microsculpture; eyes moderately protruding from lateral contours of head, approximately as long as postocular region in dorsal view (Fig. 22). Antenna slender, weakly incrassate apically; antennomere IV weakly oblong, X barely 1.5 times as wide as long (Fig. 23).

Pronotum approximately 1.25 times as wide as long and 1.25 times as wide as head; maximal width in anterior half; punctation fine and dense, barely noticeable in the pronounced microreticulation (Fig. 22).

Elytra without sexual dimorphism; slightly wider than pronotum, at suture approximately 0.9 times as long as pronotum; humeral angles moderately marked (Fig. 22); punctation rather dense, much more pronounced than that of pronotum, but not granulose; microsculpture indistinct, interstices shiny. Hind wings reduced.

Abdomen subparallel, widest at segments V-VI, slightly wider than elytra; punctation fine, sparser on posterior than on anterior tergites; microsculpture distinct everywhere; tergites VII-VIII without sexual dimorphism, tergite VIII posteriorly weakly concave in the middle (Fig. 24); posterior margin of tergite VII with narrow palisade fringe.

♂: sternite VII anteriorly with numerous gland openings, posterior margin weakly, but distinctly concave in the middle, on either side of middle with conspicuous long setae (Fig. 25); posterior margin of sternite VIII obtusely pointed and with dense marginal setae (Fig. 26); median lobe of aedeagus (Figs 27-28, 46-48) approximately 0.40 mm long, with moderately long flagellum and apical structures of characteristic shape; apical lobe of paramere as in Fig. 29.

♀: posterior margin of sternite VIII strongly convex; spermatheca as in Fig. 9.

Intraspecific variation: Size, shape, and internal structures of the aedeagus are rather constant; for illustrations of the range of variation of the aedeagus see Figs 27-28 and 46-48.

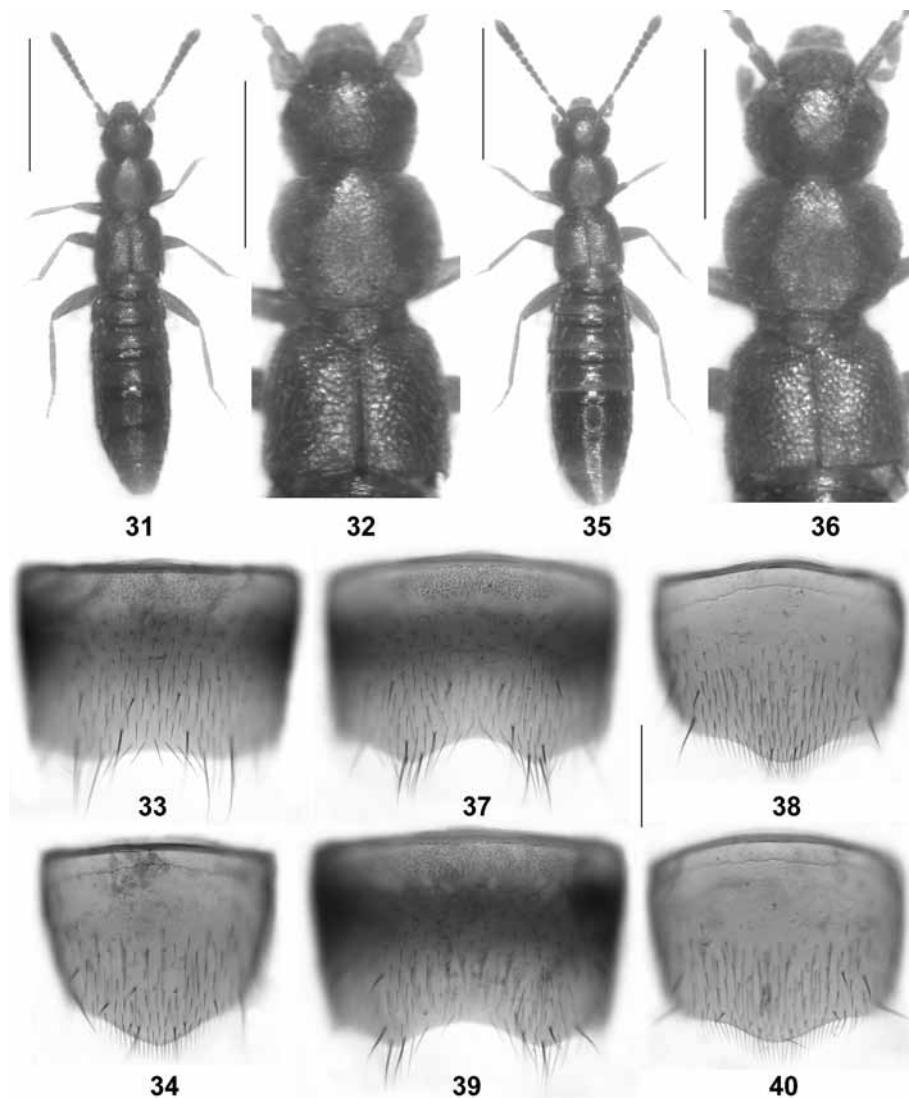
Etymology: The name (adjective) alludes to the shape of the apical internal structures of the aedeagus, which somewhat resemble the head of a shrew (Latin: *sorex*).

Comparative notes: The only species of the subgenus *Roubaliusa* SCHEERPELTZ 1966 previously known from Iran is *L. sengleti* PACE 1984 from Gilan province, whose original description is based on a single male and whose female sexual characters are unknown. *Leptusa soriciformis* is distinguished from this species by the morphology of the aedeagus, particularly the shapes of the ventral process (lateral view) and of the apical internal structures. For illustrations of *L. sengleti* see Figs 53-54 and PACE (1984, 1989).

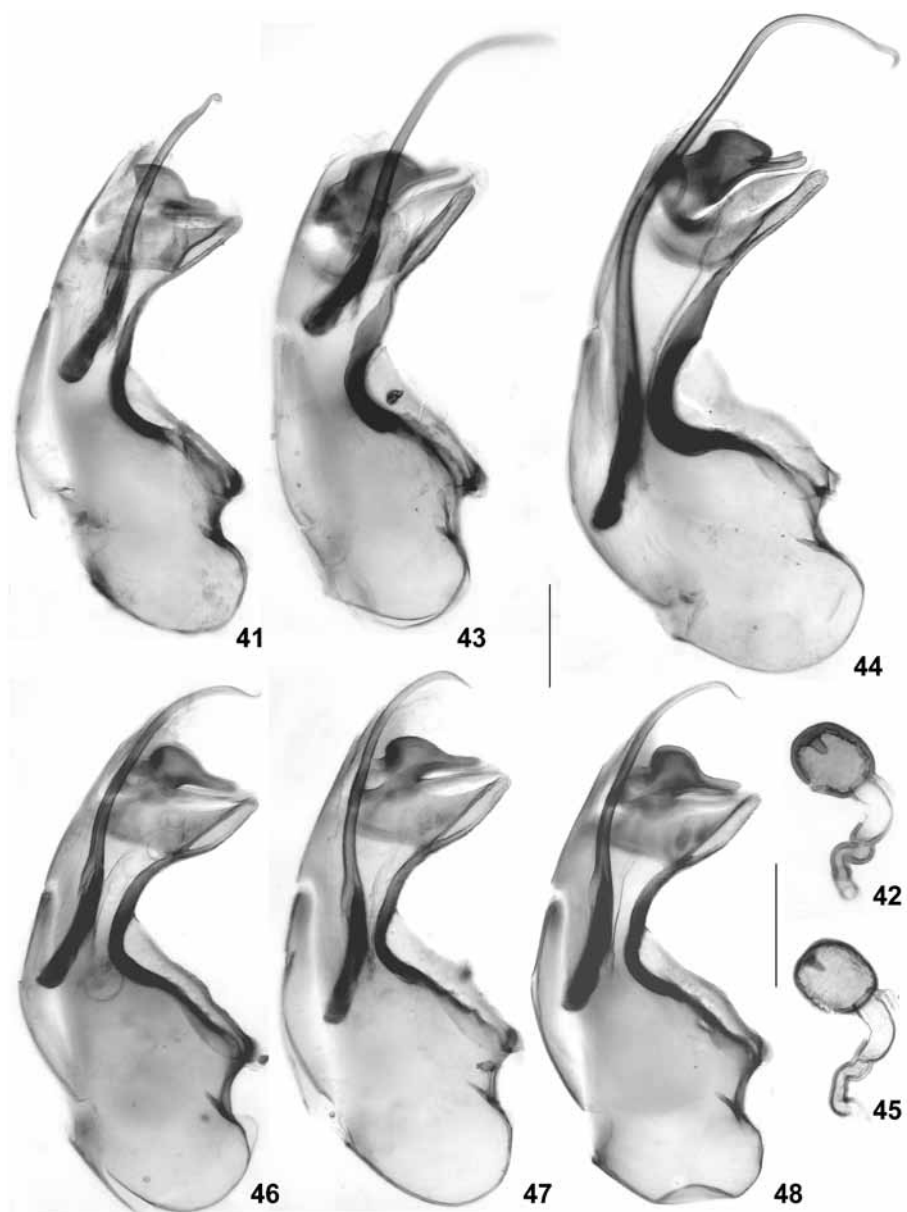
Distribution and bionomics: The type locality is situated in the Elburz range in northern Iran, some 60 km to the south of Sari (Map 4). The specimens from the type locality were collected by sifting the leaf litter of a beech forest at an altitude of approximately 1530 m. One paratype was sifted from leaf litter at an altitude of approximately 920 m.

***Leptusa (Roubaliusa) delphiniformis* nov.sp.** (Figs 31-34, 41-42, Map 4)

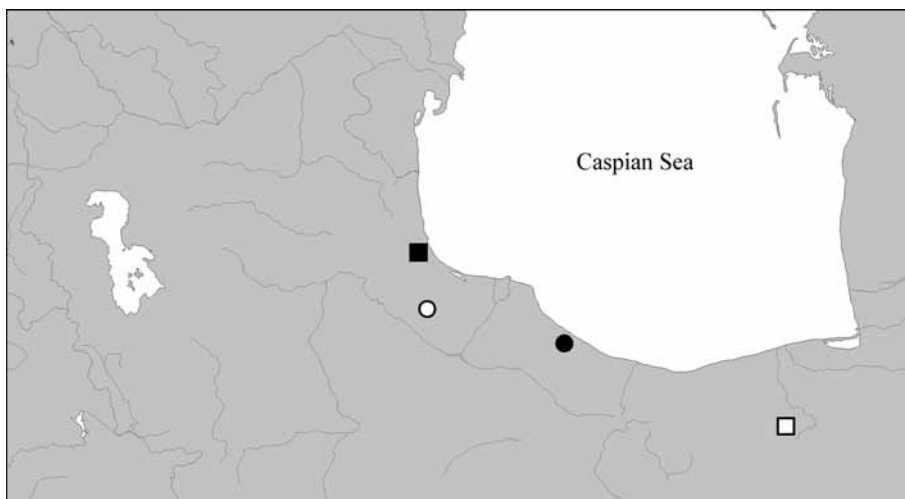
Type material: Holotype ♂: "Iran, Prov. Mazandaran [IR08-23], Ramsar County, Mohammadabad, Elburz Mts., N-Slope, Eshkatechal, small stream, 36°50'53.0"N, 50°34'64.4"E [recte: 36°50.53'N, 50°34.644'E], 1458 m, 06.VI.2008, leg. A. Pütz / Holotypus ♂ *Leptusa delphiniformis* sp. n. det. V. Assing 2009" (cPüt). Paratypes: 2 ♀♀: same data as holotype (cAss, cPüt); 1 ♀ [tentatively attributed to this species]: "Iran, Prov. Mazandaran [IR08-24], Ramsar County, Mohammadabad, Elburz Mts., N-Slope, Eshkatechal, small stream, sifted, 1055 m, 36°51'14.2"N, 50°33'22.0"E [recte: 36°51.142'N, 50°33.22'E], 06.VI.2008, leg. A. Pütz" (cPüt).



Figs 31-40: *Leptusa delphiniformis* nov.sp. (31-34), *L. piciformis* nov.sp. (35-38), and *L. flagrifera* nov.sp. (39-40): (31, 35) habitus; (32, 36) forebody; (33, 37, 39) male sternite VII; (34, 38, 40) male sternite VIII. Scale bars: 31, 35: 1.0 mm; 32, 36: 0.5 mm; 33-34, 37-40: 0.2 mm.



Figs 41-48: *Leptusa delphiniformis* nov.sp. (41-42), *L. piciformis* nov.sp. (43), *L. flagrifera* nov.sp. (44-45), and *L. soriciformis* nov.sp. (46-48): (41, 43-44, 46-48) median lobe of aedeagus in lateral view; (42, 45) spermatheca. Scale bar: 0.1 mm.



Map 4: Distributions of the *Leptusa* species of the subgenus *Roubaliusa* SCHEERPELTZ in northern Iran: *L. sengleti* PACE (filled square), *L. piciformis* nov.sp. (open circle), *L. flagrifer* nov.sp. (open circle), *L. delphiniformis* nov.sp. (filled circle), and *L. soriciformis* nov.sp. (open square). Localities where only females were found are omitted.

Description: External characters (Figs 31-32) as in *L. soriciformis*, distinguished only by the sexual characters.

♂: posterior margin of sternite VII very weakly concave in the middle, on either side of middle with conspicuous long setae (Fig. 33); posterior margin of sternite VIII obtusely angled and with dense marginal setae (Fig. 34); median lobe of aedeagus (Fig. 41) approximately 0.41 mm long, with rather short and almost straight flagellum and apical structures of characteristic shape.

♀: posterior margin of sternite VIII strongly convex; spermatheca as in Fig. 42.

Etymology: The name (adjective) alludes to the shape of the apical internal structures of the aedeagus, which somewhat resemble the head of dolphin (Latin: delphinus).

Comparative notes: *Leptusa delphiniformis* is reliably distinguished from other Iranian representatives of *Roubaliusa* by the morphology of the aedeagus, particularly by the shape of the ventral process (ventral process almost angled in lateral view), the relatively short and almost straight flagellum, and the shape of the apical internal structures. The apical internal structures of the aedeagus are somewhat similar to those of the - also externally - similar *L. sengleti*, from which the new species is distinguished by the shorter and almost straight flagellum (*L. sengleti*: distinctly curved) and by the almost angled ventral process in lateral view (*L. sengleti*: ventral process straight). From the two following species, it is additionally separated by the weakly concave posterior margin of the male sternite VII. For illustrations of *L. sengleti* see Figs 53-54 and PACE (1984, 1989).

Distribution and bionomics: The type locality is situated in Mazandaran province, in the western part of the Elburz range in northern Iran (Map 4). The specimens from the type locality were collected by sifting the leaf litter near a stream at

an altitude of approximately 1460 m. One female paratype was sifted under similar circumstances at an altitude of approximately 1050 m.

***Leptusa (Roubaliusa) piciformis* nov.sp.** (Figs 35-38, 43, Map 4)

Type material: Holotype ♂: "Iran, Gilan [IR08-29], Fuman County, Tales Mts., N-Slope, Masuleh-Khalkhal road, 4 km NW Masuleh, leaves debris, sifted, 1404 m, 37°10'34.8"N, 48°58'76.6"E [recte: 37°10.348'N, 48°58.766'E], 1458 m, 08.VI.2008, leg. A. Pütz / Holotypus ♂ *Leptusa piciformis* sp. n. det. V. Assing 2009" (cPüt). Paratype ♀: same data as holotype (cAss).

Comment: Since the type localities of *L. piciformis* and the highly similar *L. flagrifera* are identical, the above female was identified only based on its coloration.

Description: External characters (Figs 35-36) highly similar to those of *L. soriciformis*, distinguished only as follows:

Head not darker than pronotum. Pronotum larger and broader, almost 1.3 times as wide as long.

♂: posterior margin of sternite VII strongly concave in the middle, on either side of this concavity obtusely produced and with conspicuous long setae (Fig. 37); posterior margin of sternite VIII convexly produced (not pointed or angled) in the middle and with dense marginal setae (Fig. 38); median lobe of aedeagus (Fig. 43) approximately 0.44 mm long, with moderately long and moderately curved flagellum and apical structures of characteristic shape.

♀: spermatheca not distinctive.

Etymology: The name (adjective) alludes to the shape of the apical internal structures of the aedeagus, which somewhat resemble the head of a woodpecker (Latin: *picus*).

Comparative notes: *Leptusa piciformis* is reliably distinguished from other Iranian representatives of *Roubaliusa* by the morphology of the aedeagus, particularly by the shape of the ventral process in lateral view, the shape and length of the flagellum, and the shape of the apical internal structures, as well as by the deeply concave posterior margin of the male sternite VII, and the posteriorly convexly produced posterior margin of the male sternite VIII. The shape of the flagellum and of the ventral process (lateral view) are somewhat similar to those of the externally similar *L. sengleti*. From this species, *L. piciformis* is separated only by the different shape of the apical internal structures of the aedeagus (*L. sengleti*: apex shorter, shaped like the head of a dolphin, similar to that of *L. delphiniformis*), by the slightly shorter flagellum and by the slightly different shape of the contours of the median lobe in lateral view (angle between ventral process and basal portion of median lobe more acute and more deeply excavate, ventral process longer in relation to basal portion of median lobe). For illustrations of the aedeagus of *L. sengleti* see Figs 53-54 and PACE (1984, 1989).

Distribution and bionomics: The type locality is situated in the Tales mountain range in Gilan province, northwestern Iran (Map 4). The type specimens were collected by sifting moist and deep leaf litter near a stream at the margin of a beech forest at an altitude of approximately 1400 m.

***Leptusa (Roubaliusa) flagrifer* nov.sp.** (Figs 39-40, 44-45, Map 4)

Type material: Holotype ♂: "Iran, Gilan [IR08-29], Fuman County, Tales Mts., N-Slope, Masuleh-Khalkhal road, 4 km NW Masuleh, leaves debris, sifted, 1404 m, 37°10'34.8"N, 48°58'76.6"E [recte: 37°10.348'N, 48°58.766'E], 1458 m, 08.VI.2008, leg. A. Pütz / Holotypus ♂ *Leptusa flagrifer* sp. n. det. V. Assing 2009" (cPüt). Paratypes: 2 ♀ ♀: same data as holotype (cPüt, cAss).

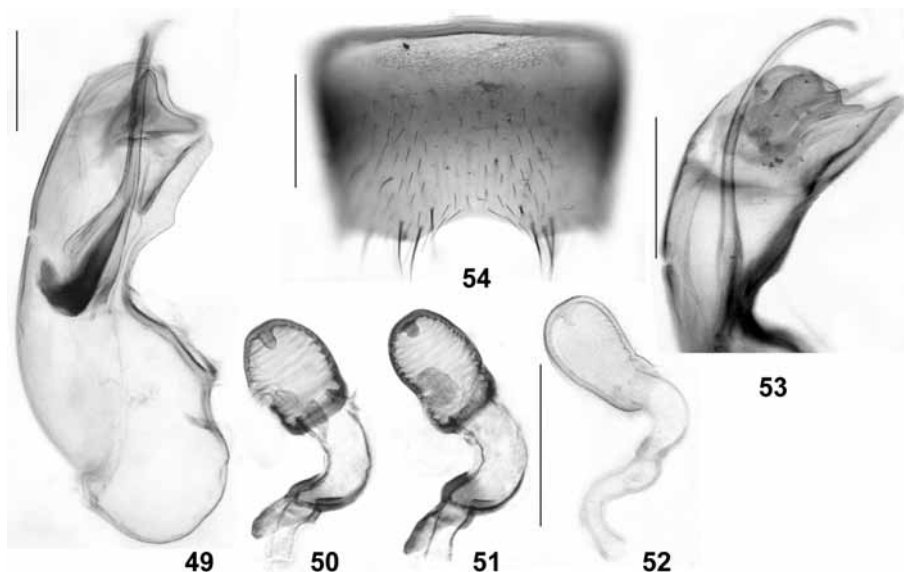
Comment: Since the holotype of *L. flagrifer* was found in the same locality as that of the highly similar *L. piciformis*, the females were identified only based on their coloration.

Description: External characters highly similar to those of *L. soriciformis*, distinguished only by the male sexual characters:

♂: posterior margin of sternite VII strongly and broadly concave in the middle, on either side of this concavity weakly produced and with conspicuous long setae (Fig. 39); posterior margin of sternite VIII convexly produced (not pointed or angled) in the middle and with dense marginal setae (Fig. 40); median lobe of aedeagus large, approximately 0.50 mm long, with conspicuously long and apically strongly curved flagellum and apical structures of characteristic shape.

♀: spermatheca as in Fig. 45.

Etymology: The name (Latin; carrier of a whip) alludes to the conspicuously long flagellum in the internal sac of the aedeagus.



Figs 49-54: *Leptusa ionopolitana* PACE (49-51), *L. amisensis* PACE (52), and *L. sengleti* PACE (53-54): (49, 53) median lobe of aedeagus in lateral view; (50-52) spermatheca; (54) male sternite VII. Scale bars: 54: 0.2 mm; 49-53: 0.1 mm.

Comparative notes: *Leptusa flagrifera* is reliably distinguished from other Iranian representatives of *Roubaliusa* by the morphology of the aedeagus (much larger, flagellum much longer, shape of apical internal structures), as well as by the shapes of the male sternites VII and VIII. It is separated from *L. sengleti*, with which it shares the similar morphology of the male sternite VII, by the completely different morphology of the aedeagus.

Distribution and bionomics: The type material was collected in the same locality (Map 4) and under the same circumstances as that of *L. piciformis*.

***Leptusa taurica* ASSING 2004**

Material examined: Turkey: Kahramanmaraş: 1 ex., W Başkonuş Yaylası, 37°34'N, 36°34'E, 1160 m, 23.IV.2009, leg. Brachat & Meybohm (cAss); 2 exs., Başkonuş Yaylası, 37°34'N, 36°34'E, 1250 m, 24.IV.2009, leg. Brachat & Meybohm (cAss).

Comment: The above specimens were collected at (or near) the type locality.

Updated catalogue of the *Leptusa* species of Turkey

The subgenera and the species of each subgenus are arranged alphabetically.

The literature references are abbreviated as follows: A02 = ASSING (2002); A03a = ASSING (2003a); A03b = ASSING (2003b); A04a = ASSING (2004a); A04b = ASSING (2004b); A06 = ASSING (2006); A07a = ASSING (2007a); A09a = ASSING (2009a); App = ASSING (present paper); B00 = BERNHAUER (1900); B09 = BERNHAUER (1909); F68 = FAGEL (1968); F100 = FAUVEL (1900); P82 = PACE (1982); P83a = PACE (1983a); P83b = PACE (1983b); P89 = PACE (1989); P96 = PACE (1996); Sc70 = SCHEERPELTZ (1970).

taxon	distribution in Turkey (provinces)	references
Subgenus <i>Dendroleptusa</i> PACE, 1983		
<i>samia</i> ASSING 2004	Manisa	A07a
Subgenus <i>Dysleptusa</i> PACE 1982		
<i>fuliginosa</i> (AUBE 1850)	Bolu, Kastamonu, Sinop, Rize, Artvin	A03a, A07a, A09a, P89
<i>improvisa</i> ASSING 2009	Antalya	A09a
Subgenus <i>Leptusa</i> KRAATZ, 1856		
<i>pulchella</i> (MANNERHEIM, 1830)	Trabzon, Rize, Artvin	A03a, A7a
Subgenus <i>Neopisalia</i> SCHEERPELTZ 1966 = <i>Stenoleptusa</i> SCHEERPELTZ, 1966		
<i>cimmeria</i> PACE, 1996	Rize	A02, A03a, A07a, P96
<i>confinis</i> PACE 1982 = <i>paphlagonica</i> PACE 1982, nov.syn. = <i>othmaniorum</i> PACE 1983, nov.syn.	Istanbul, Zonguldak, Kastamonu, Samsun, Sinop	A02, A07a, A09a, App, P82, P89
<i>crinita</i> ASSING 2007	Rize	A07a, A09a
<i>diecki</i> PACE 1983 = <i>gurgentepensis</i> PACE, 1989	Samsun, Ordu, Giresun, Gümüşhane, Trabzon	A02, A03a, A07a, A09a, App, P83a, P89
<i>janczyki</i> PACE 1983	"Lagistan, Pont. Euxin. mer."	App, P83a, P89
<i>korgei</i> SCHEERPELTZ 1970	Rize	A02, A03b, S70
<i>longilobata</i> ASSING 2007	Gümüşhane, Trabzon	A07a

taxon	distribution in Turkey (provinces)	references
<i>marasica</i> ASSING 2006	Kahramanmaraş	A06
<i>nurdaghensis</i> ASSING 2003	Hatay	A03b, A04a
<i>rizensis</i> PACE 1996	Rize	A07a, P96
<i>sica</i> ASSING 2003	Rize	A03a, A07a, A09a
<i>soganlica</i> ASSING 2007a	Trabzon	A07a
<i>spoliata</i> ASSING 2002	Ordu, Giresun	A02, A04b, A07a
<i>venusta</i> (HOCHHUTH 1849)	Trabzon, Rize, Artvin, Kars	A02, A03a, A07a, P89
Subgenus <i>Oncopisalia</i> PACE, 1982		
<i>asiatica</i> BERNHAUER 1909 = <i>abantensis</i> FAGEL 1968	Kocaeli/Sakaria ("Goek Dagħ"), Zonguldak, Bolu, Kastamonu, Ordu, Gaziantep/Osmaniye ("ostw. Osmaniye"), Van	A03a, A07a, B09, F68, P89
Subgenus <i>Roubaliusa</i> SCHEERPELTZ 1966		
<i>trapezuntis</i> PACE 1989	Ordu, Giresun, Gümüşhane	A03a, A07a, A09a, P89
Subgenus <i>Stictopisalia</i> SCHEERPELTZ 1966		
<i>amisensis</i> PACE 1982	Samsun	App, P82, P89
<i>artviniensis</i> PACE 1982 = <i>batumiensis</i> PACE 1983	Trabzon, Rize, Artvin	A02, A03b, P82, P83b, P89
<i>flagellulifera</i> nov.sp.	Kastamonu	App
<i>fibula</i> ASSING 2003	Ordu, Giresun, Gümüşhane, Trabzon	A03a, A07a, A09a
<i>ionopolitana</i> PACE 1982	Kastamonu	P82, P89, App
<i>merkli</i> BERNHAUER 1900 = <i>anatolica</i> FAUVE, 1900	Istanbul, Kocaeli, Sakarya, Bursa	A02, A03b, App, B00, FI00, P89
incertae sedis		
<i>taurica</i> ASSING 2004	Kahramanmaraş	A04a, A09a, App

Catalogue of the *Leptusa* species of Iran

The subgenera and the species of each subgenus are arranged alphabetically.

The literature references are abbreviated as follows: A08 = ASSING (2008); App = ASSING (present paper); P84 = PACE (1984); P89 = PACE (1989).

taxon	distribution in Iran (provinces)	references
Subgenus <i>Dysleptusa</i> PACE 1982		
<i>persica</i> nov.sp.	Mazandaran	App
Subgenus <i>Neopisalia</i> SCHEERPELTZ 1966 = <i>Stenoleptusa</i> SCHEERPELTZ, 1966		
<i>laeviuscula</i> (HOCHHUTH 1849)	Mazandaran	App
Subgenus <i>Roubaliusa</i> SCHEERPELTZ 1966		
<i>delphiniformis</i> nov.sp.	Mazandaran	App
<i>flagrifera</i> nov.sp.	Gilan	App
<i>piciiformis</i> nov.sp.	Gilan	App
<i>sengleti</i> PACE 1984	Gilan	App, P84, P89
<i>soriciformis</i> nov.sp.	Mazandaran	App
Subgenus <i>Stictopisalia</i> SCHEERPELTZ 1966		
<i>armeniaca</i> PACE 1989	Azerbaijan	App

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Zusammenfassung

Sechs Arten aus der Türkei und dem Iran werden beschrieben und abgebildet: *Leptusa* (*Stictopisalia*) *flagellulifera* nov.sp. (Türkei: Kastamonu), *L. (Dysleptusa) persica* nov.sp. (Iran: Mazandaran), *L. (Roubaliusa) soriciformis* nov.sp. (Iran: Mazandaran), *L. (R.) delphiniformis* nov.sp. (Iran: Mazandaran), *L. (R.) piciformis* nov.sp. (Iran: Gilan) und *L. (R.) flagrifer* nov.sp. (Iran: Gilan). Zwei Namen werden synonymisiert: *L. confinis* PACE 1982 = *L. paphlagonica* PACE 1982, nov.syn., = *L. othmaniorum* PACE 1983, nov.syn. *Leptusa amisensis* PACE 1982, bisher Subspezies von *L. ionopolitana* PACE 1982, wird als distinkte Art betrachtet. Die Geschlechtsmerkmale von *L. janczyki* PACE 1983, *L. ionopolitana*, *L. amisensis* und *L. sengleti* PACE 1984 werden abgebildet. Weitere Nachweise von *Leptusa*-Arten aus der Türkei und dem Iran werden gemeldet, darunter ein Erstnachweis aus dem Iran. Für die *Leptusa*-Fauna der Türkei und des Irans wird jeweils ein Katalog erstellt. Die Verbreitung von 13 Arten wird anhand von Karten illustriert.

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Author's address: Dr. Volker ASSING
Gabelsbergerstr. 2
D-30163 Hannover, Germany
E-mail: vassing.hann@t-online.de